Logic Switch and Circuits Utilizing the Switch

ABSTRACT OF THE DISCLOSURE

A logic switch intentionally utilizes GIDL current as its primary mechanism of operation. Voltages may be applied to a doped gate overlying and insulated from a pn junction. A first voltage initiates GIDL current, and the logic switch is bidirectionally conductive. A second voltage terminates GIDL current, but the logic switch is unidirectionally conductive. A third voltage renders the logic switch bidirectionally non-conductive. Circuits containing the logic switch are also described. These circuits include inverters, SRAM cells, voltage reference sources, and neuron logic switches. The logic switch is primarily implemented according to SOI protocols, but embodiments according to bulk protocols are described.

Figure 4A